Pacific Island Network
Vital Signs Monitoring Plan:
Phase III Report

Appendix M: Cultural Values of Pacific Island Indigenous Peoples

Compiled by Joan Yoshioka and Cory Nash (HPI-CESU)

Pacific Island Network (PACN)

Territory of Guam
War in the Pacific National Historical Park (WAPA)

Commonwealth of the Northern Mariana Islands
American Memorial Park, Saipan (AMME)

Territory of American Samoa
National Park of American Samoa (NPSA)

State of Hawaii
USS Arizona Memorial, Oahu (USAR)
Kalaupapa National Historical Park, Molokai (KALA)
Haleakala National Park, Maui (HALE)
Ala Kahakai National Historic Trail, Hawaii (ALKA)
Puukohola Heiau National Historic Site, Hawaii (PUHE)
Kaloko-Honokohau National Historical Park, Hawaii (KAHO)
Puuhonua o Honaunau National Historical Park, Hawaii (PUHO)
Hawaii Volcanoes National Park, Hawaii (HAVO)

http://science.nature.nps.gov/im/units/pacn/monitoring/plan/

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Introduction

The PACN sixth monitoring goal is to "*provide data to better understand, protect, and manage important resources that share cultural and natural value*." To address this goal, we have compiled this appendix describing the natural resources that are of cultural value to indigenous peoples of the Pacific Islands within the PACN network. These cultural resources include objects of: (a) harvest, (b) medicinal, (c) utilitarian, (d) spiritual/religious, and (e) biological value. Biological value, in this case, refer to items of both ecological and cultural significance. When applicable, we also address cultural values (e.g., reverence of places, people, and things; significance of stories and names) that provide context to the discussion of natural and cultural resources. The cultural resources and values presented in the table are limited to those values that share natural resource value and will be reflected in our monitoring objectives. In this appendix, we also summarize anthropogenic and natural-caused threats to the cultural resources or cultural values themselves. The practices and beliefs of indigenous peoples are as diverse as the individuals that comprise the cultures. For this reason, the values and resources discussed in this appendix should be viewed as examples, which are by no means exhaustive. Several NPS Cultural Resources Division staff, cultural practitioners, and other experts have provided input to this table. However, this appendix will be updated, pending additional information from other park staff and cultural representatives. Additional discussion regarding cultural resource values and their importance to the selected Vital Signs are provided in Chapter 3.

Table 1. Cultural Resources, Values and Associated Threats.

Level 1	Level 2	Vital Sign	Cultural Resources, Values and Associated Threats
Air and Climate	**Weather and Climate**	**Climate**	**I.** Spiritual/religious value: Many aspects of nature were, and still are, revered by Pacific Islanders. Perhaps no natural attribute receives as much attention as water, in its many forms. Water has been honored in chants and songs; the languages of Pacific Islanders contain countless words for wind, rain and clouds. Each manifestation has its own term describing variations in forms of clouds, mist, or winds and rains attributed to places, land divisions, and districts (Hart 2004; Valentine n.d.; A. Arakaki, pers. comm., 2005). **II.** Threats to cultural resources: Global warming is a phenomenon that could potentially raise sea-levels (USEPA 2000). In all Pacific Island parks, cultural sites and artifacts in low-lying regions are particularly susceptible to inundation. Global warming has also contributed to coral bleaching (Goreau 2002), killing culturally important corals and all the living things that depend on them. *Justification: Collecting data on the weather and climate in select parks in the context of this value reflects PACN's recognition of their cultural importance. Collecting information about global warming conditions/rising sea levels over time will increase our understanding of this devastating climatic condition on both natural and cultural resources.*
Water	**Hydrology**	**Ground-water dynamics**	**I.** Spiritual/religious value: To the Hawaiians, freshwater represented male procreative energy flowing above ground and as groundwater; it was called "water of life of Kane;" Kane means "male" or "husband" (Handy and Handy 1991). **II.** Threats to cultural values: Changes in precipitation and surface and ground water affect vegetation, which has cultural value in itself and affects the sense of place or setting and traditional land use on a landscape (P. Hartzell, pers. comm., 2005). *Justification: Groundwater was and still is an important cultural resource for island groups. It is also a crucial source of freshwater for island economies. Monitoring short- and long-term response of an aquifer from baseline measurements will determine whether there are human-induced and non-anthropogenic stresses on groundwater reserves.*

Level 1	Level 2	Vital Sign	Cultural Resources, Values and Associated Threats
Water	**Water Quality**	**Water chemistry**	**I.** Cultural context: The importance of water to many Pacific Island cultures is reflected in meanings of the term, which not only refers to the physical description, but is also a term used for concepts of wealth, life, emotions, and as a carrier of wisdom from one generation to the next (Valentine, n.d.). Specific water-associated names were also applied to caves, springs, streams, other water sources, and places where fresh and salt water occur and mix. Location of water sources influenced settlement patterns and many natural habitats were modified for this purpose. **II.** Harvesting value: In Hawaii and elsewhere, water was an important resource used for drinking, cooking, etc. **III.** Utilitarian value: Water in Pacific Island cultures was and still is important for bathing, and often the same sources are important habitat for harvested species including fish, invertebrates, and useful plants (e.g., makaloa, a sedge used for mats). In Hawaii, access to brackish ponds (possibly fresh water lenses) affected coastal settlement locations. At HALE, traditional Hawaiian agricultural farming is being practiced through a cooperative agreement with the park. This farm relies heavily on water from the park's freshwater streams (NPS 2005). In Hawaii parks, fishponds (e.g., Kaloko and Aimakapa fishponds) were dependent on water to raise fish for subsistence. **IV.** Biological value: In Hawaii parks, fresh or brackish water environments sustain native plant and animal populations used in past and present cultural practices. *Justification: In all of the PACN parks, water is an essential resource to any culture that lives off the land and an integral part of culture beyond its physical description. Monitoring the quality of water supports the NPS' commitment to preserve, protect, and enhance resources of cultural value.*
Biological Integrity	**Invasive species**	**Status and trends of establish-ed invasive plants**	**I.** Threats to cultural resources: Polynesians, Micronesians, and Melanesians have had traditions of intentionally introducing culturally significant species to new-found lands. These species are no longer considered invasive but the substantial changes that have occurred as a result are known. In all of the PACN parks, there are important culturally useful native plant species at different ecological zones that are presently affected by invasive plants. Often the threat to culturally important plants occurs through habitat displacement or competition for resources (Cuddihy and Stone 1990). Established invasive plants in all PACN parks negatively impact culturally significant plant populations used in dance, food, medicines, fishing, and lighting, decoration, etc. In Guam and Samoa, *Intsia bijuga* (ifit in Chamorro, the territorial tree of Guam; ifiele in Samoan), has attractive wood used for building and woodworking and is becoming an increasingly rare cultural resource due to overcollection and habitat displacement by invasives (Wilkie et. al. 2002). **II.** Threats to cultural sites: Archeological sites are being disrupted or covered by alien plants at several PACN parks. *Justification: Determining the status and trends of invasive species and monitoring invasives along entry corridors will help to assess the threats to culturally important species that make up the natural habitats of PACN parks.*

Level 1	Level 2	Vital Sign	Cultural Resources, Values and Associated Threats
Biological Integrity	**Invasive Species**	**Early detection of invasive plants and inverte-brates**	**I.** Threats to cultural resources: In all PACN parks, newly established invasive plants or invertebrates have the potential to impact culturally significant plant populations used in dance, food, medicines, fishing, lighting, and decoration, among others. Often the threat to culturally important plants occurs through competition for resources and habitat displacement (Cuddihy and Stone 1990). *Justification: Early detection of invasive species, especially incipient populations, will help to perpetuate these culturally important species that make up the natural habitats of PACN parks.*
Biological Integrity	**Focal Species or Communi-ties**	**Benthic marine community**	**I.** Harvest value: In Samoa, faisua (giant clams) and palolo (polychaete worms) are important for food. In all PACN parks, minerals such as salt and earth (e.g. alae [red earth in Hawaiian]), shell and bone also have cultural significance. In Hawaii, uku (lobster), pearl oysters, opihi (limpets), various crabs, and wana (sea urchins) were collected for food. Sea salt (paakai) and seaweed collection is an ongoing cultural practice (Gutmanis 1976). **II.** Medicinal value: In Hawaii, certain seaweeds (e.g., limu kohu, limu eleele, limu kala, limu paipai) are important food items or used in medicines (Gutmanis 1976). **III.** Utilitarian value: In Hawaii, corals, fish bones, shark teeth, and invertebrate shells were historically used as tools or part of tools (e.g. coral sander, fish hooks and shell lures, shark teeth for weapons) (Bishop Museum 2003). **IV.** Spiritual/religious value: In Hawaii, all corals are culturally important; corals are the first organisms (of many) mentioned in "He Kumulipo," the 2000+ line long Hawaiian creation chant (Beckwith 1951). *Justification: Many of the resources listed above are depleted or are threatened. Monitoring benthic marine communities, diseases and coral bleaching and their impacts on marine ecosystems will provide data on these important resources and form a basis by which important management decisions can be made.*
Biological Integrity	**Focal Species or Communi-ties**	**Marine fish**	**I.** Harvest Value: In the Pacific Islands, which are surrounded by vast ocean, fishing is an important and vital cultural practice that continues to support indigenous cultures for food and/or sport. **II.** Utilitarian value: Sharks teeth were also used in Pacific Islander weaponry and necklaces. Historically, fish and other vertebrate bones were used for fish hooks (Bishop Museum 2003). **III.** Spiritual/religious value: Sharks, for example, are known to be aumakua (family guardians) for some Hawaiian families and were often considered guardians of the sea. Sharks (as embodiments of Gods) are often prominent figures in Pacific Island mythology (Kamakau 1987). *Justification: The health of marine fish populations has direct impacts on cultures that depend on them. Monitoring the trends and populations of these resources provides much-needed information so mitigation actions can be taken to sustain marine fish populations for future generations.*

Level 1	Level 2	Vital Sign	Cultural Resources, Values and Associated Threats
Biological Integrity	**Focal Species or Communi-ties**	**Freshwater animal communi-ties**	**I.** Harvest value: In Hawaii, various stream animals (e.g., nerites, shrimp, fish, and algae) were, and to a limited extent, are still important food items (PSRC n.d.). In Hawaii, opae ula (red shrimp) in anchialine ponds play a very important role in fishing practices as fish bait, collected for human consumption, and sold as aquarium novelties and live food for aquarium fish (NPS 2005; S. Stephens, pers. comm., 2005;). Native damselfies (*Megalagrion* spp) were used by the ancient Hawaiians practicing aquaculture (Dunbar 1997). **II.** Spiritual/religious value: Damselflies and dragonflies are important as aumakua and dragonfly nymphs in freshwater environs were used in indigenous rituals in Hawaii (Howarth et al. 1998). **III.** Biological value: Anadromous fish larvae that hatch in freshwater streams and washed out to sea are important food sources for benthic marine fish upon which Hawaiians depend (J. Yoshioka, pers. comm., 2005). **IV.** Threats to cultural resources: Freshwater sources are threatened by various anthropogenic causes. For example, current pig-rearing practices in Samoa create run-off contaminants that threaten water resources such as freshwater eel and shrimp which are important food items for Samoans (E. Suafoa-Taua'i, pers. comm., 2005). **V.** Threats to cultural practices: In Hawaii, some coastal traditional fishing relied on spotting fishes from promontories, or when throw-netting, as fish migrated into clear coastal waters in bays or coves. If water quality is impacted these practices are threatened as well (L. Basch, pers. comm., 2005). *Justification: Monitoring these freshwater biotic species not only supports the protection of them and their habitats, but also helps to protect their place in Pacific Island cultures.*

Level 1	Level 2	Vital Sign	Cultural Resources, Values and Associated Threats
Biological Integrity	**Focal Species or Communi-ties**	**Focal terrestrial plant communi-ties**	**I.** Harvest value: Although Polynesians and Micronesians introduced many food plants from their place of origin, these indigenous peoples also harvested native plants. For example, in Hawaii, kookoolau (*Bidens* spp.) and mamaki (*Pipturus albidus*) were common tea plants and ohelo (*Vaccinium* spp.) and fern shoots were food items. In Guam, coconut crabs found in focal plant communities are important food items for Chamorros. **II.** Medicinal value: In Hawaii and Samoa, dozens of native plants and indigenously introduced plants were sources of medicines from ancient times to present (Krauss, n.d.). **III.** Utilitarian value: In Hawaii, Guam, Samoa, and Saipan, native and Polynesian- or Micronesian-introduced species had a wide variety of historic uses and were of important value. These plants were used for staple and famine foods, mats, cordage, decoration, toys, clothing, ornaments, baskets, fishing gear, sails, perfumes/scents, floats, hats, toilet paper, deodorants, soap/shampoo, toothbrushes, weapons, hunting tools, weed control, insect repellent, poisons, timber, traps, wrappers, canoes/boats, soil improvement, embalming material, aphrodisiacs, fertility control, seasonings, meat tenderizers, preservatives, drugs/medicines, artifacts, totems, magico-religious artifacts, musical instruments, fuels, containers, fire making, masticants, brushes, torches/lamps, boundary markers, dyes, adhesives, insulation, caulking, recreation, teas, cages/roosts, animal food, commercial products, abrasives, shade, brooms, and fans (Bishop Museum 2003, Whistler 2000). Some of these may include rare, threatened, or endangered (RTE) species. In Guam, ifit (*Instia bijuga*) is an important plant used in wood carving and other important cultural activities that exist today. Although not officially designated as Threatened or Endangered, it is becoming increasingly rare on Guam. **IV.** Spiritual/religious value: Specific sites as well as entire ecosystems or regions were places of reverence (For example, wao akua, or "forest of the gods" [Hawaiian], is the upper elevation forests covered by mist [Handy and Handy 1991], a focal plant community). In Hawaii, maile (*Alyxia oliviformis*) and various native ferns continue to be used for hula and other cultural practices. Certain native plants are recognized as kinolau (body form) of important Hawaiian gods. **V.** Biological value: Remnant dryland forests at PUHO were used historically for dry terrace cultivation of crops such as taro, sweet potato, sugar, and wauke (*Broussenetia* sp.) (NPS 2005). *Justification: Monitoring terrestrial species and their communities provides information about the health of the ecosystem in which they live and directly and indirectly protect these culturally significant species. Collections of rare, threatened, or endangered species directly impact remaining populations. Monitoring impacts of collections of these resources is vital to their survival.*

Level 1	Level 2	Vital Sign	Cultural Resources, Values and Associated Threats
Biological Integrity	**Focal Species or Communi-ties**	**Landbirds**	**I.** Harvest value: In many Pacific Island cultures, land birds had been important food sources (e.g., nene in Hawaii, rails in Guam, etc.). Some species are still harvested today. For example in Samoa, the lupe (Pacific pidgeon), an important seed disperser, are still trapped for consumption, despite its prohibition (NPS 2005; E. S. Tauai, pers. comm., 2005). **II.** Utilitarian value: In historical Hawaii, the feathers of forest birds (oo, mamo, iiwi, apapane) were important for lei, kahili (feather standards), capes, and other clothing or ornaments worn or used by Pacific Islanders or their leaders. Although the collection of feathers from native birds is no longer an ongoing practice because the birds are extinct, rare or uncommon, the cultural practice of creating feather leis using alternative bird feathers continues today. **III.** Spiritual/religious value: In Hawaii, pueo (Hawaiian short-eared owls) are aumakua. Elepaio (a species of native Hawaiian flycatcher) are the guardian spirit of canoe makers; these birds indicated to canoe makers which trees were undesirable for use. In Hawaii, the kolea (golden plover) is associated with the god Lono. This bird can be found in all PACN parks. Knowing the terrestrial and marine life forms that are associated with the akua and aumakua and understanding the links between terrestrial and marine life forms are culturally important. Understanding why they are associated may tell us something about the species, the habitat and management thereof (A. Arakaki, pers. comm., 2005). **IV.** Biological value: These birds are also important pollinators of culturally significant plants used in dance, medicines, food, etc. **V.** Threats to cultural resources: In PACN parks, bird hunting, and plant collecting for food or cultural/traditional practices/sport, and the environmental impacts of feral pigs may have directly affected forest passerine bird populations by disturbing/destroying critical bird habitat and spreading disease such as avian malaria. In PACN parks, the introduction of predatory alien animals (e.g. Brown Tree Snakes on Guam; cats, rats, and mongoose in Hawaii) and plants have reduced forest bird populations significantly and have had a negative impact on cultural practices by depleting, extirpating, or causing the extinction of culturally important passerines. *Justification: Collecting data about these culturally significant birds provides a basis by which NPS can make management decisions to protect the species in perpetuity.*
Biological Integrity	**Focal Species or Communi-ties**	**Seabirds**	**I.** Harvest value: Various seabirds were important sources of protein for Pacific Island cultures (e.g., petrels, shearwaters, boobies). Historically, the eggs and chicks of seabirds were eaten by Hawaiians (Stone and Pratt 1994). **II.** Utilitarian value: Seabird bones were used for tools by Hawaiians and Samoans (USFWS 2005; J. Nakamura, pers. comm., 2005). In historic Hawaii, red-tropicbird feathers and frigate birds were used in kahili (feather standards) (Rose et al. 1993). **III.** Spiritual/religious value: Seabirds are prominent icons in Pacific Island mythology and identified in chants and dances. For example, the kaupu (Laysan albatross) was used during specific ceremonies as a symbol of the god Kahoalii in Hawaii (Kamakau 1987). **IV.** Threats to cultural resources: Populations of seabirds are now threatened by non-native predatory animals and by overfishing (e.g., black noddies rely on large fishes to drive their small prey fishes to the surface) (Stone and Cuddihy 1994). *Justification: Monitoring the long-term trends of shearwaters, petrels, boobies, and other seabirds provides information to manage these culturally significant species for future generations. Also looking to modern uses of coastal areas may help determine the effects of present-day practices such as fishing strategies, etc.*

Level 1	Level 2	Vital Sign	Cultural Resources, Values and Associated Threats
Biological Integrity	**Focal Species or Communi-ties**	**Bats**	**I.** Harvest value: Frugivorous bats have a significant cultural position in Samoan and Chamorro cultures as they are important food items in festivities although harvesting is illegal (NPS 2001, Sheeline 1991). **II.** Spiritual/religious value: These bats are prominent figures in Samoan folklore that represent fertility and survival, both important motifs of Samoan culture (Sinavaiana and Enright, n.d.). Ancient Hawaiians called the hoary bat opeapea, as its wings reminded them of the half-leaf remaining on the taro stalk after the top half has been removed for cooking (Pukui and Elbert 1986). It is important to identify the specific cultural hunting strategies that may have an impact on populations of these animals in Hawaii parks. **III.** Biological value: Hawaiian hoary bats are primary predators of night-flying insects, some of which are agricultural pests (Fullard 1989) or spread diseases and as such are valuable to commercial, agricultural, and natural ecosystems. Frugivorous bats are important seed dispersers, pollinators of strictly bat- or starling-pollinated plants (Cox et. al. 1991). **IV.** Threats to cultural resources: Illegal hunting of these animals for food or export continues to have an impact on frugivorous bat populations, especially at NPSA and AMME (Craig et al. 1994, Sheeline 1991). *Justification: Determining the presence, distribution, and activity levels of insectivorous and frugivorous bats provides data about the stability of this culturally significant species.*
Land-scapes (Eco-system Pattern and Process)	**Landscape Dynamics**	**Land use patterns**	**I.** Cultural context: Cultural uses of the land may have influenced how land is used today. Subsistence agricultural use in and around NPSA and WAPA actively continues today. Historically, the extensive ALKA trail has been associated with many population centers of the island and its landscape has distinctive Hawaiian resources including heiau, fishing settlements and gardening terraces (Dunbar 1997). According to Chamorro legend, human beings first ask for permission to enter strange districts so as not to incur the wrath of ancestral family spirits such as the Taotaomona (ghost, demons, monstrous, ogre-like figures) (Torres 2003). *Justification: Land use outside of parks may threaten cultural resources such as water resources, cultural landscapes, viewscapes, soundscapes, etc. Monitoring land use patterns will provide data that does not currently exist. This information can be used to mitigate further impact on the parks' cultural and natural resources.*
Geology and Soils	**Soil Quality**	**Erosion and Deposition**	**I.** Threats to cultural sites: At PUHE, sedimentation could result in the inundation or degradation of the offshore Pelekane Shark Heiau. At WAPA, sedimentation may have a significant impact on survival, reproduction, and recruitment of corals (Minton 2005), some of which are culturally important. In addition, sedimentation threatens submerged World War II artifacts at USAR and WAPA and AMME. **II.** Threats to cultural resource: Erosion and deposition of soil in the ocean impacts marine and near-shore cultural resources, including sites as well as biotic communities. *Justification: Overall deposition of soil and its impact on marine ecosystems will provide data on important natural and cultural resources and form a basis by which important management decisions can be made. Monitoring the deposition of soil in the marine environment will help ensure the preservation of these important cultural sites and biotic communities by providing data that could alert resource managers of impending damage or destruction to the resources.*

el 1	Level 2	Vital Sign	Cultural Resources, Values and Associated Threats
Biological Integrity	**Focal Species or Communi-ties**	**Cave communi-ties**	**I.** Harvest value: In Hawaii, caves were important for water collection. The Hawaiians carved water collection troughs from various native trees (Handy and Handy 1995). **II.** Utilitarian value: In the Pacific, caves served as temporary shelters and refuges (Bryan 1915). **III.** Spiritual/religious value: In Hawaii, Guam and Saipan, caves have significance for a variety of cultural uses including burial sites (Bryan 1915, Torres 2003). *Justification: In PACN parks that house natural and human-excavated caves, it is important to monitor human impacts to reduce, eliminate, or prevent degradation of these culturally important caves and the vulnerable natural and cultural resources within them. In PACN parks, drip caves and water seepage caves are important cultural sites because, as water sources, they suggest settlement patterns of indigenous communities and determine where trails are located. For this reason, they warrant monitoring and protection.*
Biological Integrity	**Focal Species or Communi-ties**	**Focal & rare, threatened, and endan-gered plant species**	**I.** In Hawaii parks, there are flowers of several RTE species that could potentially be collected for ceremonial leis. *Justification: Threatened and endangered plant species are subject to the federal Endangered Species Act and state law. Harvesting these plants for cultural practices is therefore prohibited, although collection may occur. Monitoring RTE plant populations and harvesting practices determines whether harvesting is detrimental to rare species populations and whether threatened and endangered plant protection efforts are adequate.*
Biological Integrity	**Focal Species or Communi-ties**	**Terrestrial invert-ebrate communi-ties**	**I.** Harvest value: Native damselfies (Megalagrion spp.) were used by the ancient Hawaiians practicing aquaculture (Dunbar 1997). **II.** Spiritual/religious value: Damselflies and dragonflies are important as aumakua (L. Basch, pers. comm., 2005). According to Chamorro legend, mosquitoes are the transformation of a young wife and are associated with Taotaomona, mischievous spirits or ghosts (Torres 2003). **III.** Biological value: Invertebrates are important pollinators of culturally important plant species and are food sources for culturally important bird species (Cuddihy and Stone 1990). *Justification: Monitoring terrestrial invertebrates not only supports the protection of them, their habitats, and the plants and animals that depend on them, but also helps to protect their place in Pacific Island cultures.*
Human Use	**Consump-tive Use**	**Fisheries harvest**	**I.** Harvest Value: In the Pacific Islands, which are surrounded by a vast ocean, fishing is an important and vital cultural practice that continues to support indigenous cultures for food and/or sport. *Justification: The health of marine fish populations has direct impacts on cultures that depend on them. Monitoring the trends and populations of these resources provides much-needed information so mitigation actions can be taken to sustain marine fish populations for future generations.*

- Citations for cultural values information are from literature sources, park staff, experts, and pertinent websites.

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